

5.3.12.1 Demographic Characteristics

The No Action Alternative would not likely result in any noticeable change in existing demographic characteristics within the ROI (Section 4.14.3). Overall expenditures and employment at SNL/CA should remain relatively constant over the next 10 years, which, in turn, would tend to maintain demographic characteristics within the ROI.

5.3.12.2 Economic Base

The No Action Alternative would not likely result in any noticeable change in the existing economic base within the ROI (Section 4.14.3) because employment levels and research and development (R&D) activities are assumed to remain the same as current levels. Additionally, the No Action Alternative would have no effect on the amount of expenditures for goods and services in the local and regional economy. Overall expenditures and employment should remain relatively constant.

5.3.12.3 Housing and Community Services

The No Action Alternative would not likely result in any noticeable change in existing housing and community services within the ROI (Section 4.14.3). Overall expenditures and employment at SNL/CA should remain relatively constant, which, in turn, would tend to maintain housing availability, value, and levels of service. Contributory effects from other industrial and economic sectors within the ROI should reduce or mask SNL/CA's current proportional impact.

5.3.13 ENVIRONMENTAL JUSTICE

The No Action Alternative would have no discernible adverse impacts to land use and visual resources, water resources, biological resources, cultural resources, air quality, infrastructure, transportation, waste generation, noise, or socioeconomics. Thus, no disproportionately high and adverse impacts to minority or low-income communities would be anticipated.

As presented in Section 5.3.11, SNL/CA operations would have minimal potential to adversely affect human health for offsite residents or onsite workers. Thus, no disproportionately high and adverse impacts to minority or low-income communities would be anticipated for this resource area.

Based on the analyses of all the resource and topic areas, impacts that would result during the course of normal operations would not pose disproportionately high and adverse health or environmental impacts on minority and low-income populations. Table 5-15 provides a brief summary of potential impacts to each resource or topic area.

5.4 PLANNED UTILIZATION AND OPERATIONS ALTERNATIVE

5.4.1 LAND USE AND VISUAL RESOURCES

The Planned Utilization and Operations Alternative would include the No Action Alternative plus several additional actions and would not affect existing land use patterns or visual resources at SNL/CA. Sections 5.4.1.1 and 5.4.1.2 discuss impacts to these resource areas from the Planned Utilization and Operations Alternative.

5.4.1.1 Land Use

No impacts would occur to land use patterns at SNL/CA under this alternative. The extent of DOE land available for use by SNL/CA, 410 acres, would remain the same as for the No Action Alternative. SNL/CA operations would remain consistent with industrial research park uses and would have no foreseeable effects on established land use patterns or requirements.

This alternative differs from the No Action Alternative in that improvements would be made to Arroyo Seco. These improvements would meet a number of needs, mainly correcting the effects of past erosion, protecting the SNL/CA site from future erosion and flooding, and improving channel stability and the wildlife habitat. These improvements would occur directly along the arroyo channel and would not change current land use plans. As part of the improvements to Arroyo Seco, storm water drainage infrastructure throughout the site would be improved, but this also would not change any land use at the site. Thirty acres along the arroyo in the east buffer zone would be managed as a wildlife reserve.

Under the Planned Utilization and Operations Alternative, a Grant of Easement and Agreement would be made with the landowner concerning the land along the SNL/CA western boundary. Activities by the landowner would be subject to the agreement, limitations, and disclosures.

Under this alternative, 93 acres of open space adjacent to East Avenue and existing facility areas would be reserved for future construction of offices, facilities, support buildings, associated infrastructure, paved areas (parking areas, services areas, and sidewalks), roads, and for onsite soil management (see Figure 5-5). Onsite soil management would involve placing dirt/fill from the Arroyo Seco improvement, storm water projects, and construction projects in 25 of the 93 acres of open space. Locating future construction projects near existing facilities would minimize effects to land use. Construction in these areas would be consistent with established land use patterns at SNL/CA.

Under this alternative, 122 acres of open space would be identified as undesignated. Construction of the new

Table 5-15. Summary of Potential Environmental Justice Impacts under the No Action Alternative

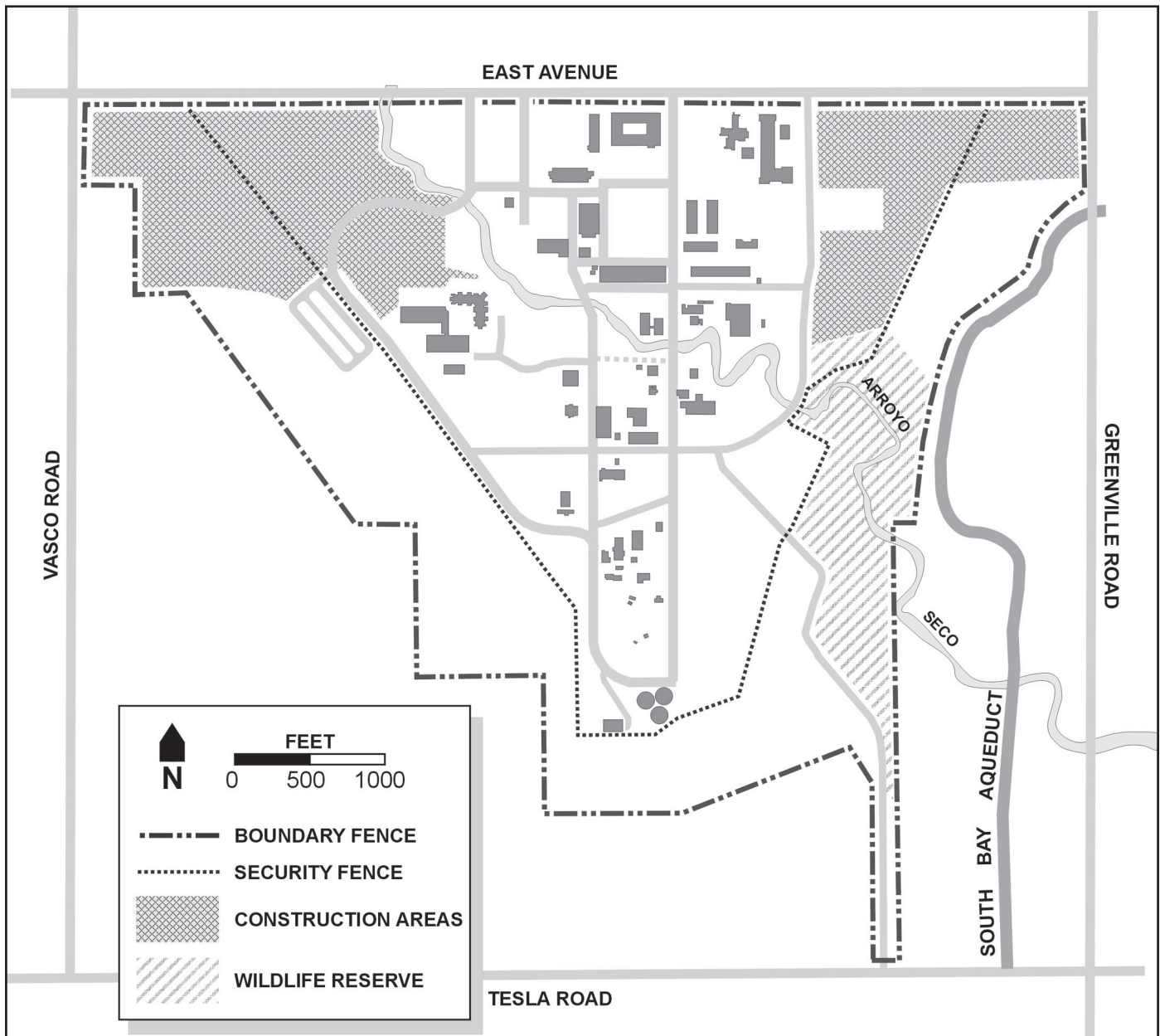
Resource or Topic Area	Summarized Effect	Effect on Resource or Topic Area (region of influence)	Proportional Effect on:	
			Low-Income	Minority Neighborhoods
Land Use and Visual Resources	No changes in land use; minor changes in developed areas of SNL/CA	Not adverse	Not adverse	Not adverse
Geology and Soils	SNL/CA activities are not anticipated to destabilize slopes. Minimal deposition of contaminants to soils and continued monitoring of existing contaminates.	Not adverse	Not adverse	Not adverse
Water Resources and Hydrology	No significant adverse impacts are projected.	Not adverse	Not adverse	Not adverse
Biological Resources	No significant adverse impacts are projected.	Not adverse	Not adverse	Not adverse
Cultural Resources	Lack of existing cultural resources.	Not adverse	Not adverse	Not adverse
Air Quality	Emissions would be below the most stringent standards, which define the pollutant concentrations below which there are no adverse impacts.	Not adverse	Not adverse	Not adverse
Infrastructure	All projected activities within capacities of existing road and utility systems.	Not adverse	Not adverse	Not adverse
Transportation	Material (Annual Shipments Radioactive, Chemical, and Explosives): 33 trips Waste (includes hazardous & radioactive): 76 shipments Sanitary Waste: 52 shipments Commuter vehicles: 700 to 1,000 vehicles SNL/CA Weekly Hazardous Materials Transports (excluding waste): 1 to 3 outbound shipments per week (Total of 33) Supplier Weekly Hazardous Material Transports: 1 to 3 inbound shipments per week Total of 100	Not adverse	Not adverse	Not adverse
Waste Generation	All waste projections within capacities of existing waste management operations.	Not adverse	Not adverse	Not adverse
Noise and Vibration	Background noise levels would continue at current levels from generators, air conditioners, and ventilation systems. Temporary increases during construction range from 50 to 70 dB)	Not adverse	Not adverse	Not adverse
Human Health and Worker Safety	Total recordable cases of accident or injury: 43 – 54 Lost Workday Cases: 10 – 13	Not adverse	Not adverse	Not adverse
Socioeconomics	SNL/CA workforce: 1,043 – 1,317 SNL/CA total economic activity: 180 M	Not adverse	Not adverse	Not adverse

Sources: Original

dB: decibel

M: million

SNL/CA: Sandia National Laboratories, California



Sources: Original

Figure 5-5. Construction and Wildlife Areas

Sandia National Laboratories, California plans to change land use of open spaces including setting aside 93 acres for future construction and 30 acres for wildlife

badge office on the western portion of SNL/CA would be consistent with established land use and utilization patterns, as explained under the No Action Alternative (Section 5.3.1). Modifications to Building 916 would have no impact on land use. With these changes, SNL/CA land use and operations would remain consistent with industrial park uses and would have no foreseeable effects on established land use patterns or requirements.

5.4.1.2 Visual Resources

The Planned Utilization and Operations Alternative would not adversely change the overall appearance of

the existing landscape, obscure views, or otherwise detract from the scenic views from SNL/CA or from areas adjacent to the site.

The 93 acres set aside for future construction and soil management would be located near areas with a high density of buildings and structures, thus any construction would blend with the existing built environment. All construction would be consistent with campus-style design and the guidelines presented in the *Master Plan* (Royston *et al.* 1993). Increasing the size of the main campus would have little effect on the scenic qualities of the SNL/CA site. Improvements to Arroyo Seco and

the designation of a wildlife reserve would improve the scenic qualities of these areas.

5.4.2 GEOLOGY AND SOILS

As with the No Action Alternative, no impacts to general geology and geologic resources are anticipated. Additionally, there would be no increase in the likelihood of impacts from seismic activity.

The Arroyo Seco Improvement Plan would remove 4,000 to 5,000 cubic yards (yd³) of soil (clean dirt/fill) per year to a 25-acre soil management area in the area designated for future construction. Assuming even distribution over 25 acres, this would represent less than a 1.5-inch elevation increase. The arroyo improvement activities would require 30,000 to 60,000 yd³ of new fill, rock, stone, and concrete (other materials would include mulch, hay, topsoil, seed, plants, etc.). However, these measures would improve the overall conditions of the streambank, improve slope stability, and reduce soil erosion.

Under the Planned Utilization and Operations Alternative, soil disturbed by construction would increase above the No Action Alternative. A new building totaling 5,000 sq ft would be constructed. New parking and other traffic controls (such as a bus turnaround) would require 8 acres. Upgrades to storm water runoff areas would be beneficial in controlling erosion.

Activities at SNL/CA would increase by 13 percent above the No Action Alternative, increasing the likelihood of a spill or release to the environment; however, controls are in place to minimize the potential for soil contamination from any SNL/CA operations.

5.4.3 WATER RESOURCES AND HYDROLOGY

5.4.3.1 Water Resources and Hydrology

Impacts to water resources of the Planned Utilization and Operations Alternative would not differ substantively from impacts described in Section 5.3.3 for the No Action Alternative. Impacts to groundwater quality and quantity and surface water quality and quantity are described in Sections 5.4.3.1, 5.4.3.2, 5.4.3.3, and 5.4.3.4 respectively.

5.4.3.2 Groundwater Quality

Section 5.3.3 identifies sources of groundwater contamination at SNL/CA. All groundwater quality impacts described in Section 5.3.3.1 are alternative-independent. The Planned Utilization and Operations Alternative would not change the nature or extent of groundwater contamination. No changes from current rate and scope of the Environmental Restoration (ER) Program remediation activities (long-term monitoring) are projected for the Planned Utilization and Operations Alternative.

5.4.3.3 Groundwater Quantity

Under the Planned Utilization and Operations Alternative, SNL/CA would not use groundwater for any portion of its supply. Therefore, no effects to groundwater quantity would be expected.

5.4.3.4 Surface Water Quality

SNL/CA impacts to surface water quality are discussed in Section 5.3.3.3. Under the Planned Utilization and Operations Alternative, an additional 27.7 acres of impervious surface (an additional 56 percent) would be created. This increase could add to the quantity of pollutant runoff. However, based on current monitoring data, pollutant concentrations in runoff have not been a concern. The projected increase in impervious surface is unlikely to increase pollutant concentrations to levels approaching water quality standard limits. No effects to storm water compliance would be anticipated.

5.4.3.5 Surface Water Quantity

Storm Water Runoff

SNL/CA impacts to surface water quality are discussed in Section 5.3.3.4. Under the Planned Utilization and Operations Alternative, an additional 27.7 acres of impervious surface (an additional 56 percent) would occur. This projected increase in impervious surface would increase the quantity of storm water runoff transported directly or indirectly into the Arroyo Seco. Upgrades to the storm water runoff areas are planned to correct existing erosion problems. The overall impact to surface water quantity would be minimal.

Discharge to Sanitary Sewer

The estimated annual volume of water discharged to the sanitary sewer under the Planned Utilization and Operations Alternative would be 13.6 to 21.5 M gal (based on a 13 percent increase in staff site-wide), an 8.8 percent increase from the No Action Alternative (also the baseline). The current system capacity is adequate to handle the increase (see Section 5.4.7). SNL/CA policy prohibits the discharge of regulated chemical wastes to the sanitary drain. The Wastewater Management Program participates in laboratory planning activities and staff training so that proper wastewater disposal practices are implemented as soon as the processes are online.

SNL/CA maintains a wastewater monitoring station in the northwestern portion of the site. The sewer discharges to the LLNL sewer system across East Avenue. Monitoring results are reported to the Livermore Wastewater Reclamation Plant (LWRP) monthly in monthly wastewater discharge reports. This anticipated increase in discharge would have no detrimental effects to receptors downstream of the site outfall.

5.4.4 BIOLOGICAL RESOURCES

Under this alternative, planned activities have the potential to affect plant and animal species within the boundaries of SNL/CA. Impacts would be minimal. Facility construction would result in the loss of some vegetation with a commensurate loss of wildlife habitat. Any direct or indirect losses of animals would be very small and some displaced animals may be able to occupy adjacent, unoccupied habitat. A newly created 30-acre wildlife reserve would include part of the Arroyo Seco improvements (Figure 5-5). This wildlife reserve would contribute to the preservation of plant and animal species at SNL/CA and provide a valuable refuge for both plant and animal species in the area.

Positive impacts to wetland areas and protected species may occur. These impacts are discussed for the Arroyo Seco Improvement Program, construction projects covered by the SWEA over the next 10 years, and installation maintenance operations.

5.4.4.1 Arroyo Seco Improvement Program

The Arroyo Seco is an ephemeral stream that runs through the developed portion of the SNL/CA site. Most of the channel is steep-sided, highly incised, with a trapezoidal to almost V-shaped cross section. Since establishment of SNL/CA in 1956, several bridges, security grates, and utility pipe crossings have been placed in and across Arroyo Seco. In the 1980s, additional arroyo modifications shortened and straightened the arroyo downstream of C Street, resulting in an increase in the channel slope and the amount of energy available for erosion of the streambed and banks. The *Arroyo Seco Management Plan* documented the resulting headcutting, or upstream migration of streambed instability, that has contributed to scouring in the bed and undercutting at structure crossings and where the channel is lined (GMA 2002a).

During the past five years, several informal consultations between DOE Sandia Site Office (SSO) and USFWS have discussed erosion control and streambed stability projects on Arroyo Seco. As a consequence of these consultations, SNL/CA and DOE have implemented an integrated approach to address erosion and other streambed instability issues for Arroyo Seco. The *Arroyo Seco Management Plan* identifies concepts for active channel improvements and stream zone management that would reduce current flood and erosion risk while providing additional and improved habitat and migration conditions for protected species that may use Arroyo Seco on SNL/CA property (GMA 2002a). The management plan proposes 18 improvement tasks that would provide riparian habitat enhancement.

Approximately 10 acres in and along the arroyo channel would be affected by the tasks proposed in the *Arroyo Seco*

Management Plan. About two acres identified for improvement are located within designated critical habitat for the California red-legged frog (GMA 2002a). Disturbances would be of a short-term nature associated with construction. Annual surveys for California red-legged frogs conducted on SNL/CA property since 1996 detected no individuals of this species. However, California red-legged frogs may use the Arroyo Seco as a travel corridor during or after rain events in the winter and spring (66 FR 14626). To avoid impacts to migrating California red-legged frogs, activities proposed in the *Arroyo Seco Management Plan* would be conducted during the dry season (that is, June 1 through September 30). Annual surveys for California red-legged frogs would continue at SNL/CA along the length of Arroyo Seco, specifically targeting those locations where work would be done during a particular year.

Erosion damage at 11 locations within the channel would be repaired. Repair activities along the Arroyo Seco would generally be beneficial to native vegetation, reducing soil disturbance that is conducive to invasion by weed species, and reducing episodic destruction of established vegetation during high flow events, thereby improving the site for native riparian species (SAIC 2001a). Approximately 1,800 linear ft of floodplains would be constructed to reduce flow velocities within the channel. Native riparian vegetation would be planted at four locations along the Arroyo Seco resulting in an additional 0.2 acres of riparian habitat (SNL/CA 2002c). Any improvements that would result in increased water depth and plant cover would increase the likelihood of California red-legged frogs using the drainage as summer habitat or as a travel corridor (SAIC 2001a). Five structures/ utility lines that are obstructions for species migration would be removed from the streambed. Debris that is an obstruction to species migration would also be removed from three locations in the arroyo. Activities that remove obstructions and debris from the arroyo drainage would increase its habitat value for California red-legged frog and other riparian-dependent species (SNL/CA 2002c).

In previous years, the California tiger salamander has been found at SNL/CA in upland areas, at the LLNL recharge basin located on the western side of the site, and in a farm pond east of the site. However, no individuals were found during a recent targeted survey (SAIC 2001a). In a study of terrestrial habitat use by the tiger salamander, individual tiger salamanders showed no indication of movement along creeks or riparian vegetation (Trenham 2001a). Additionally, this study showed that 95 percent of adult California tiger salamanders probably stay within 568 ft of their breeding ponds. The closest *Arroyo Seco Management Plan* activities would occur approximately 820 ft from the recharge basin and approximately 980 ft from the farm pond (both of which are outside the disturbance area of arroyo restoration activi-

ties). Therefore, there should be no effect on the California tiger salamander (SNL/CA 2002c).

5.4.4.2 Construction Projects

SNL/CA and DOE/SSO have identified approximately 93 acres of open grassland for future building construction, construction-related activities, and infrastructure improvements (Figure 5-6). Construction-related ground disturbance would occur in the area (SNL/CA 2002c).

Facility construction would result in the loss of some vegetation with a commensurate loss of wildlife habitat. Any direct or indirect losses of animals would be very small and some displaced animals may be able to occupy adjacent unoccupied habitat. Facility construction would avoid loggerhead shrike nests (a Federal species of concern and California species of special concern) whose locations have been monitored as shown in Figure 4-12. Further, the western burrowing owl (a Federal species of concern and California species of special concern) has not been sighted since 1997 in proposed construction or other areas of SNL/CA (SAIC 2001a).

At SNL/CA, 0.44 acres of the Arroyo Seco have been determined to be jurisdictional wetlands (SAIC 1998a). The use of standard soil erosion and sedimentation control measures during the land disturbance phase of new projects would ensure the protection of the wetland. Depending on the amount of soil disturbed at a particular time, the erosion control measures may require preparation of a storm water pollution prevention plan.

Of the 93 acres identified for construction and soil management, 35 acres on the east side of the SNL/CA site are located within designated critical habitat for the California red-legged frog. The critical habitat area is grassland with no surface water sources. The area does not provide any permanent habitat for red-legged frogs and is approximately 200 ft from the Arroyo Seco at its closest location. The grassland area would be used by the California red-legged frog as a dispersal habitat at night, during the wet season (that is, October 1 through May 31). Facilities in the area would be low-density development and low-use roadways that should not create a barrier to dispersal. Any new roads in the area would be used primarily during daylight hours, with intermittent use by SNL/CA security (less than 30 cars per hour) during the night. Low-density development and low-use roadways are not considered barriers to dispersal for the California red-legged frog (SNL/CA 2002c; 66 FR 14626).

Excess soil from construction and construction-related activities potentially would be stockpiled on the eastern side of the site, within designated critical habitat for the California red-legged frog. These clean soils would include native materials and may include some compacted fill and topsoil.

Construction activities would be conducted during the day, when California red-legged frogs are typically not dispersing. Although construction activities would be conducted within designated critical habitat for the California red-legged frog, construction should not form a barrier to dispersal and no permanent habitat sources are present in the area.

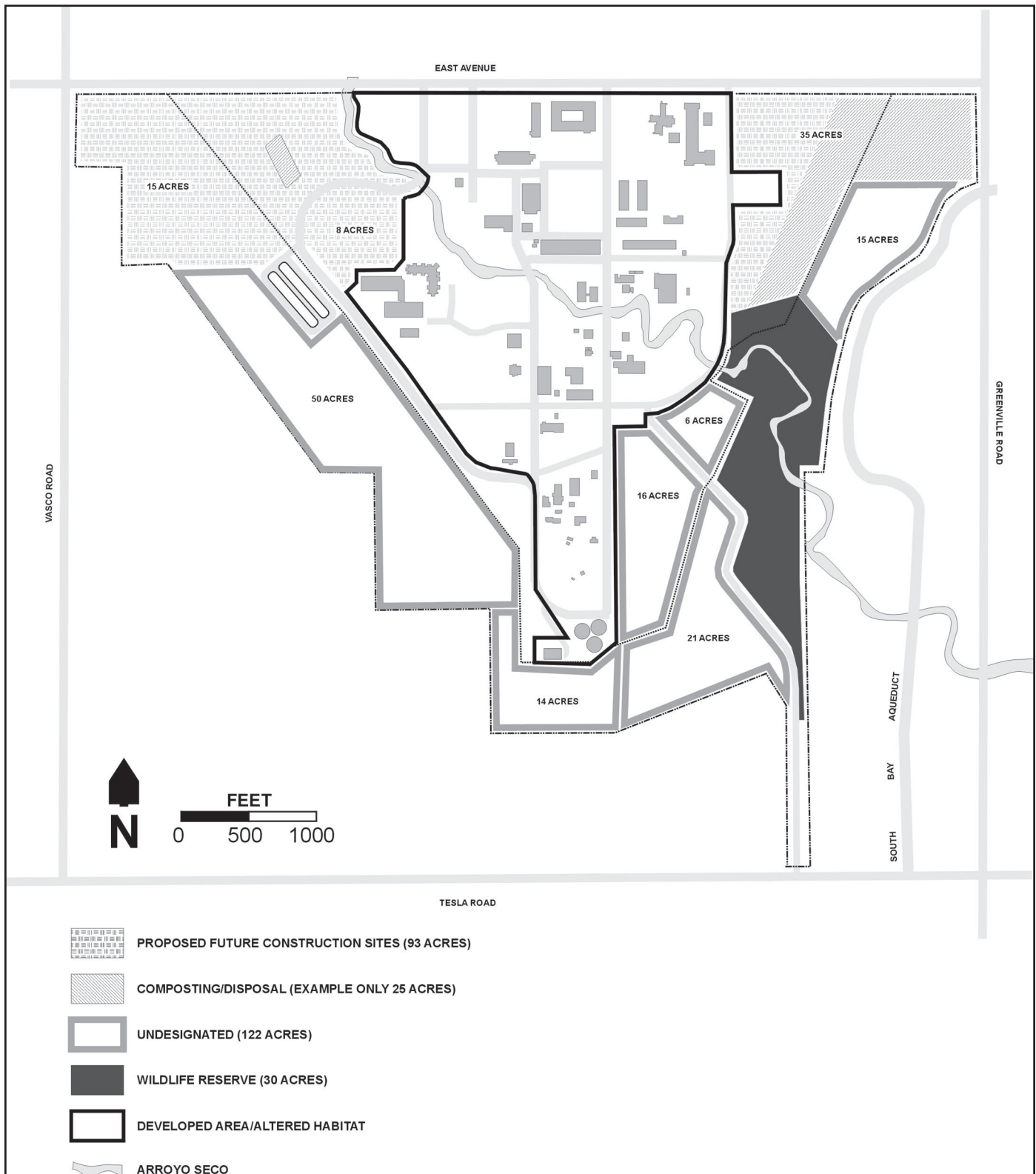
Areas proposed for construction on the west side of SNL/CA are outside designated critical habitat for the California red-legged frog. However, approximately 24 acres are within 568 ft of the LLNL recharge basin, where California tiger salamanders have been found in the past. The area also contains numerous ground squirrel burrows that may provide aestivation habitat for the tiger salamander. Before ground disturbance within the 568-ft zone noted above, each burrow would be surveyed for tiger salamanders using an infrared optical probe. A qualified field biologist would conduct the surveys and provide oversight during excavation activities. Any tiger salamanders found during the surveys would be relocated to the closest area outside of the construction zone. With implementation of this survey process, California tiger salamanders are not expected to be adversely affected.

A Biological Assessment has been prepared. The biological assessment was submitted to the USFWS on July 19, 2002, and is currently under review by this agency.

5.4.4.3 Maintenance Operations

Maintenance activities within the undeveloped areas of the site include mowing and herbicide use for fire management. Grasslands at SNL/CA, including areas within designated critical habitat for the California red-legged frog and potential habitat for the California tiger salamander, are mowed two or three times per year to reduce the fuel load. Mowing occurs in the spring and early summer and is done during daylight hours. For areas that are inaccessible to a mower (near fence lines and roadways), a water-soluble mixture of 2 percent Round-Up herbicide is used to control vegetation. Maintenance activities are conducted during daylight hours when California red-legged frogs and California tiger salamanders are typically not dispersing. Additionally, maintenance activities do not create barriers to dispersal within the critical habitat area (SNL/CA 2002c).

In the final rule listing the California red-legged frog as threatened, the USFWS identified activities that could potentially affect the species. Those activities include mowing of wetland or riparian vegetation and pesticide applications in violation of label restrictions (61 FR 25813). DOE has placed a moratorium on disking and rototilling for weed abatement in undeveloped areas and the buffer zone to minimize impact to protected and sensitive species (SNL/CA 2000a). Under current site maintenance operations, no wetland or riparian vegeta-



Source: SNL/CA 2002d

Figure 5-6. Future Construction and Maintenance Activities at Sandia National Laboratories, California

tion is mowed. Round-Up is used in accordance with the manufacturer's guidelines in a dilute mixture. Individual animals would not be sprayed, nor would areas within the arroyo channel. For these reasons, it is concluded that maintenance activities would not affect the California red-legged frog and the California tiger salamander.

5.4.5 CULTURAL RESOURCES

Planned Utilization and Operations Alternative would have no impacts to cultural resources due to the lack of prehistoric and Native American resources and historic archaeological sites, the nature of the buildings and structures present, and compliance with applicable regulations and established procedures for the protection and conservation of cultural resources located on lands administered by the DOE.

The likelihood of potential impacts to buried archaeological sites would be greater under this alternative than the No Action Alternative. This is due to increased ground-disturbing activities under this alternative. In addition to the LTF and DISL facilities identified in the No Action Alternative, the Planned Utilization and Operations Alternative would include one new facility (the new 5,000 sq ft badge office), the upgrade of storm water runoff areas, and road construction and paved service and parking areas. In addition, improvements to Arroyo Seco, the development of the 30-acre wildlife reserve, and associated infrastructure would occur under this alternative, although most of the ground-disturbing activities would occur in areas that have been previously disturbed. Maintenance activities that require ground disturbance could also result in the discovery of buried archaeological sites, but again, compliance with regulations and procedures would address any impacts. In all cases, compliance with regulations and procedures would ensure any impacts to cultural resources would be minimal by avoiding, reducing, or mitigating the potential impacts.

5.4.6 AIR QUALITY

The Planned Utilization and Operations Alternative would have at 30 to 32 nonexempt emission sources including:

- 12 boilers (includes boiler for the new badging facility)
- 1 degreasers
- 1 spray booth
- 9 backup generators (may include 1 additional backup generators for the new badging facility)
- 1 mixer
- 6 miscellaneous sources

Based on a projected site-wide staff increase of 13 percent, traffic emissions are estimated to increase 13 percent above the No Action Alternative. Table 5-16 presents the criteria pollutant emissions estimated for the Planned Utilization and Operations Alternative.

Table 5-17 estimates the Planned Utilization and Operations Alternative air toxics emissions, based upon the maximum emission rate during the period 1996 through 2001. Comparison of the Planned Utilization and Operations Alternative air toxic emissions with Bay Area air toxic emissions show that SNL/CA projects toxic emissions are less than one percent of those for the Bay Area.

Construction activities at SNL/CA could have short-term adverse impacts due to emissions of criteria air pollutants from construction worker traffic, construction equipment, and fugitive dust from earth-moving activities. Under the Planned Utilization and Operation Alternative, construction activities would include projects under the

Table 5-16. Criteria Pollutant Emission Rates for the Planned Utilization and Operations Alternative (kilograms per year)

Pollutant	Planned Utilization and Operations Alternative ^a	Bay Area Emission Year 2000	Percent Contribution from SNL/CA
Particulates	NA	57,900,000	NA
Volatile Organic Compounds	1,871	179,000,000	< 1
Sulfur Dioxide	NA	29,100,000	NA
Nitrogen Dioxide	3,741	214,000,000	< 1
Carbon Monoxide	339 to 452	995,000,000	< 1

Source: SNL/CA 2002b

Notes: Based on a 13% increase in Sandia National Laboratories, California staff

All Bay Area wide emissions except particulates are based on an average summer day multiplied by 365 days. Bay Area particulate emissions are based on an average winter day multiplied by 365 days

^aBay Area Air Quality Management District (BAAQMD) inventory is reported annually for period July to June

<: less than

NA = not available/not applicable

SNL/CA: Sandia National Laboratories, California

Table 5-17. Air Toxic Emission Rates for the Planned Utilization and Operations Alternative (kilograms per year)

Pollutant	Planned Utilization and Operations Alternative ^a	Bay Area Emission Year 1999 ^b	Percent Contribution from SNL/CA
1,1,1-trichloroethane	235.1	58,968	< 1
1,4-dioxane	5.5	771	< 1
Ammonia	238.412	1,406,160	< 1
Benzene	0.32	28,577	< 1
Carbon tetrachloride	0.36	1,406	< 1
Formaldehyde	3.4	81,648	< 1
Methyl alcohol	681.77	276,696	< 1
Methylene chloride	75.55	49,896	< 1
Perchloroethylene	74.84	371,952	< 1
Toluene	43.04	335,664	< 1
Trichloroethylene	66.391	21,773	< 1
Xylene	14.77	276,696	< 1

Sources: TTNUS 2002a, SNL/CA 2002b

^aBased on maximum emission rate from 1996 through 2001^bBay Area Air Quality Management District (BAAQMD) inventory is reported annually for period July to June

<: less than

NA: not available/not applicable

SNL/CA: Sandia National Laboratories, California

No Action Alternative plus one new project. The fugitive dust from construction could exceed PM_{10} concentration standards if no dust control measures were implemented. However, engineered controls, such as the application of water or chemical dust suppressants and seeding of soil piles and exposed soils, would minimize fugitive dust. It is expected that PM_{10} concentrations would be within all applicable standards.

Table 5-18 estimates construction-related CO emissions for one typical project. It is expected that construction-related CO emissions would be within all applicable standards. Table 5-19 estimates the Arroyo Seco Improvement CO emissions for a typical year of activities. This project is anticipated to last 10 years.

The estimated number of daily commuter vehicles to SNL/CA during FY 2001 was 700 to 1000. Under the Planned Utilization and Operations Alternative, a 13-percent increase in daily commuter traffic would occur, resulting in 791 to 1130 vehicles. Increases of carbon monoxide and nitrogen oxides, an ozone precursor, would occur with the increase in commuter traffic. However, the EPA model considers future vehicles will have lower emission rates and more stringent inspection and maintenance programs, actual emissions would be less than the baseline. In addition, the BAAQMD vehicle buy back program designed to remove older vehicles from the road will continue and contribute to the reduction in commuter vehicle emissions (SNL/CA 2002b, TtNUS 2002a, BAAQMD 2001).

Total carbon monoxide emissions are shown in Table 5-20. Total carbon monoxide emissions for the Planned Utilization and Operations Alternative would be slightly below the 2000 baseline, well below the 100 tons per year incremental increase above baseline that would require a conformity determination. In addition, the total carbon monoxide emissions for the Planned Utilization and Operations Alternative were found to be less than 1 percent of the maintenance area's emissions of carbon monoxide. As a result, the NNSA has concluded that no conformity determination is required for the Planned Utilization and Operations Alternative.

5.4.7 INFRASTRUCTURE

The Planned Utilization and Operations Alternative would increase demands on infrastructure over the next 10 years (Table 5-21). Annual consumption of water, electricity, and natural gas would be consistent with recent historic levels (DOE 1992a; TtNUS 2002a). Fluctuations in utility consumption rates would occur due to annual changes in weather. Under the Planned Utilization and Operations Alternative, the current infrastructure would be capable of accommodating SNL/CA facility requirements and no major additional infrastructure facilities would be required.

5.4.8 TRANSPORTATION

Based on the current transportation data, the Planned Utilization and Operations Alternative would increase the

**Table 5-18. Estimated Carbon Monoxide Emissions
Associated with Representative Construction Activities**

1-Year Construction Activity (assumes 21-work day months or 252 days)	Total Annual Hours of Operation	Equipment Emission Factors ^a	Estimated Total Annual Carbon Monoxide Emissions (total pounds per year)	Estimated Total Annual Carbon Monoxide Emissions (total tons per year)
Assumptions for Diesel Vehicles Emissions				
7 Diesel Units (trucks for transportation of materials to site throughout life of construction phase)	3528 (or 2 hours per day each for 252 days)	0.11	388	0.194
8 Diesel Units (dozers, backhoes, graders, dump trucks to grade and lay foundation)	800 (or 5 hours per day each for 20 days)	0.11	88	0.044
6 Diesel Units (forklifts, crane, front end loader, other equipment for construction of buildings)	10,584 (or 7 hours per day each for 252 days)	0.11	1,164	0.582
Total Diesel units (21)	14,912	N/A	1,640	0.82
Assumptions for Gasoline Vehicles Emissions				
24 Light Gasoline units (worker personal vehicles, snack wagons, light commercial vans)	6,048 (or 1 hour per day each for 252 days)	0.48	2,903	1.451
2 Hand tampers	160 (or 4 hours per day each for 20 days)	0.48	77	0.38
Total Gas units	6,208	N/A	2,980	1.49
Total Estimated CO Emissions during Typical Construction Phase	4,620 pounds		2.31 tons	

Source: DOE 2001f

^aCarbon Monoxide (CO) emission factors are based on the Environmental Protection Agency (EPA) National Vehicle and Fuel Emission Laboratory (Ann Arbor, Michigan) average emission rates for idling vehicles. CO emissions for light-duty trucks are estimated at 219 grams per hour, for heavy-duty gas vehicles at 245 grams per hour, and for heavy-duty diesel vehicles at 50 grams per hour. Calculations are based on a conversion factor of 0.035 ounce per gram (grams x 0.035) divided by 16 (ounces per pounds) times hour's operation divided by 2,000 (pounds per ton) to obtain tons/yr.

**Table 5-19. Estimated Carbon Monoxide Emissions Associated
with Soil and Fill Material during Arroyo Seco Improvement^a**

Typical Year (assumes 21-work day months or 252 days)	Total Annual Operation	Equipment Emission Factors ^b	Estimated Total Annual Carbon Monoxide Emissions (total pounds per year)	Estimated Total Annual Carbon Monoxide Emissions (total tons per year)
Assumptions for Diesel Vehicles Emissions				
200 Diesel Units trips (trucks for transportation of soil materials from Arroyo Seco and associated locations throughout SNL/CA to offsite location 20 miles from site over next 10 years)	400 hours per year (or 2 hours per trip 200 trips per year)	0.11	44	0.022
300 Diesel Units trips (trucks for transportation of incoming material including rock, concrete, and other fill soil materials for Arroyo Seco and associated locations throughout SNL/CA from offsite location 20 miles from site over next 10 years)	600 hours per year (or 2 hours per trip 300 trips per year)	0.11	66	0.033

Table 5-19. Estimated Carbon Monoxide Emissions Associated with Soil and Fill Material during Arroyo Seco Improvement^a

Typical Year (assumes 21-work day months or 252 days)	Total Annual Operation	Equipment Emission Factors ^b	Estimated Total Annual Carbon Monoxide Emissions (total pounds per year)	Estimated Total Annual Carbon Monoxide Emissions (total tons per year)
Assumptions for Diesel Vehicles Emissions				
8 Diesel Units (dozers, backhoes, graders, dump trucks to grade and lay foundation)	800 (or 5 hours per day each for 20 days)	0.11	88	0.044
6 Diesel Units (forklifts, crane, front end loader, other equipment for construction)	10,584 (or 7 hours per day each for 252 days)	0.11	1,164	0.582
Total Diesel units (21)	N/A	N/A	1,362	0.681
Assumptions for Gasoline Vehicles Emissions				
24 Light Gasoline units (worker personal vehicles, snack wagons, light commercial vans)	6,048 (or 1 hour per day each for 252 days)	0.48	2,903	1.451
2 Hand tampers	480 (or 4 hours per day each for 60 days)	0.48	230	0.12
Total Gas units	6,208	N/A	3,133	1.57
Total Estimated CO Emissions during Improvement Phase	4,495 pounds		2.25 tons	

Sources: SNL/CA 2001I, TiNUS 2002a

^aAssumed project would last for 10 years.^bCarbon Monoxide (CO) emission factors are based on the Environmental Protection Agency (EPA) National Vehicle and Fuel Emission Laboratory (Ann Arbor, Michigan) average emission rates for idling vehicles. CO emissions for light-duty trucks are estimated at 219 grams per hour, for heavy-duty gas vehicles at 245 grams per hour, and for heavy-duty diesel vehicles at 50 grams per hour. Calculations are based on a conversion factor of 0.035 ounce per gram (grams x 0.035) divided by 16 (ounces per pounds) times hours operation divided by 2,000 (pounds per ton) to obtain tons per year.^cTo bound the analysis, trucks transporting soil were assumed to ship to offsite locations. SNL/CA may manage some or all soil onsite.

SNL/CA: Sandia National Laboratories, California

Table 5-20. Carbon Monoxide Emissions from Sandia National Laboratories, California under the Planned Utilization and Operations Alternative (tons per Year) and Calendar Year 2000 (baseline)

Stationary Sources	Mobile Sources	Construction Activities	Total
Planned Utilization and Operations Alternative			
0.45	208	6.9 ^a	219.0
Baseline			
0.4	214	6.9 ^a	221.3

Source: EPA 1995

Notes: Mobile Source Emission Factors assumptions Baseline (2000) 24.77 grams per mile, the No Action Alternative (2005) 21.29 grams per mile, 1,000 to 1,130 vehicles, 30-mile trip, average speed 35 miles per hour.

^aAssumed two typical construction projects each year (2.31 tons per project) plus the Arroyo Seco project (2.25 tons per year).

amount of highway and pedestrian infrastructure within SNL/CA by approximately 56 percent (Table 5-22).

The number of truck shipments from SNL/CA would increase by 538 vehicles per year (11 per week) from the No Action Alternative. Of these 200 would be hauling soil. The number of commuter vehicles would increase by approximately 91 to 130. The increased number of ship-

ments and the increase in employee vehicles would not represent substantial increases in the number of vehicles on the road by virtue of the area's projected population growth and would have no significant impact on the region. Based on the relatively small number of additional vehicles, the potential for accidents should be no different from current conditions.

Table 5-21. Annual Sandia National Laboratories, California Utility Usage and Capacities under the Planned Utilization and Operations Alternative

Utility	Planned Utilization and Operations Alternative	System Capacity	Usage as Percent of Capacity
Water Use	56.5 to 67.8 M gal	922 M gal	6 to 7
Wastewater Discharge	13.6 to 21.5 M gal	81 M gal	17 to 27
Electrical Use	39,850 MWh	239,000 MWh	17
Natural Gas Use	94 M ft ³	430 M ft ³	22

Source: TtNUS 2002a, Royer 2002

ft³: cubic feet

M gal: millions of gallons

MWh: megawatt hour

Table 5-22. Transportation Activities under the Planned Utilization and Operations Alternative

Activity	No Action Alternative	Planned Utilization and Operations Alternative	Change from No Action Alternative
Paved and unpaved road	6.2 miles	9.7 miles	+3.5 miles
Pedestrian mall	4 acres	6.24 acres	+2.24 acres
Paved service areas	5.5 acres	8.6 acres	3.1 acres
Paved service parking	12.7 acres	19.8 acres	+7.1 acres
Material (Annual Shipments Radioactive, Chemical, and Explosives)	33 trips	37 trips	+4 trips
Waste (includes hazardous & radioactive)	76 shipments	86 shipments	+10 shipments
Sanitary Waste	52 shipments	59 shipments	+7 shipments
SNL/CA Weekly Hazardous Materials Transports (excluding waste)	1 to 3 outbound shipments per week (Total of 33)	1 to 3 shipments (Total of 37)	+4 shipments
Supplier Weekly Hazardous Material Transports	1 to 3 inbound shipments per week (Total of 100)	1 to 3 shipments (Total of 113)	+13 shipments
Soil Transports	NR	1,600 to 2,000 shipments over 10 Years	+200 shipments
Incoming Material (Rock, Soil, Concrete)	NR	1,500 to 3,000 shipments over 10 Years	+300 shipments
Site-Related Traffic - Total Daily traffic	700 to 1,000 vehicles	791 to 1,130 vehicles	+91 to 130 vehicles

Source: TtNUS 2002a

NR: not reported

5.4.9 WASTE GENERATION

The Planned Utilization and Operations Alternative would not cause any major changes in the types of waste streams generated onsite. Waste generation levels at SNL/CA would increase, consistent with 13 percent increases in laboratory operations. However, existing waste minimization and pollution prevention measures would control the extent of the waste generation increase. Under the Planned Utilization and Operations Alternative, waste projections used for analysis would not exceed existing waste management capacities.

Waste generation would be expected to increase by 13 percent above the 5-year average under the Planned Utilization and Operations Alternative. For specific facilities, the CY 2000 waste generation data were considered and increased or decreased based on the individual facility staffing projections. Existing operations wastes are considered to be derived from mission-related work. New operations are discussed separately in order to show the maximum likely existing operational increases. The projected totals would be below recent highs experienced within the last five years (see Tables 4-10 and 4-11).

5.4.9.1 Radioactive Wastes

Existing Operations

The Planned Utilization and Operations Alternative would generate LLW and LLMW but not TRU waste or high-level waste. Projections for radioactive waste generation for all operations are shown in Table 5-23. Projections for radioactive waste generation at specific facilities from new and existing operations are shown in Table 5-24.

SNL/CA anticipates a 13 percent increase in the generation of LLW from all operations over the next 10 years. LLMW generation would increase by 13 percent for all operations through 2012. There would be sufficient management capacity to accommodate anticipated radioactive wastes. LLW and LLMW are shipped offsite for final disposal.

New Operations

New Operations would not generate LLW and LLMW (Tables 5-23 and 5-24).

Balance of Operations (Maintenance and Decontamination and Decommissioning)

SNL/CA anticipates 5,998 kg per year of LLW and 510 kg per year of LLMW would be generated from balance of operations over the next 10 years (Table 5-23). There would be sufficient management capacity to accommodate projected radioactive wastes. Maintenance and D&D wastes are not expected to impact SNL/CA waste management operations.

Current Capacity

The total radioactive waste generated per year requiring offsite disposal at licensed/approved facilities would not exceed the existing storage and handling capacities at the Radioactive Waste Storage Facility. Projections indicate that radioactive waste throughput would increase by 13 percent. SNL/CA routinely ships radioactive waste to various offsite governmental and commercial treatment and disposal facilities. All waste is shipped to meet regulatory requirements. Based on these projections and contin-

Table 5-23. Average Annual Radioactive Waste Generation under the Planned Utilization and Operations Alternative (in kilograms)

All Waste	Unit	5-Year Average (1996 to 2000) ^a	Planned Utilization and Operations Alternative
LLW			
Existing Operations	kg	198	156
New Operations	kg	0	0
Balance of Operations	kg	5,110	5,842
SNL/CA Total LLW	kg	5,308	5,998
Percent Change		0%	+13.0%
LLMW			
Existing Operations	kg	0	0
New Operations	kg	0	0
Balance of Operations	kg	451	510
SNL/CA Total LLMW	kg	451	510
Percent Change		0%	+13.1%
Total All Radioactive Waste			
Existing Operations	kg	198	156
New Operations	kg	0	0
Balance of Operations	kg	5,561	6,352
SNL/CA Total All Radioactive Waste	kg	5,759	6,508
Percent Change		0%	+13.0%

Sources: SNL/CA 2002b; TtNUS 2002a

^a5-year average represents the No Action Alternative excluding new facilities

%: percent

LLW: low-level waste

LLMW: low-level mixed waste

SNL/CA: Sandia National Laboratories, California

Table 5-24. Average Annual Generation by Specific Sandia National Laboratories, California Facilities under the Planned Utilization and Operations Alternative (in kilograms)

Facility	Calendar Year 2000			Planned Utilization and Operations Alternative		
	LLW	LLMW	Hazardous ^a	LLW	LLMW	Hazardous ^a
Existing Facilities						
Combustion Research Facility (CRF)	0	0	2,444	0	0	2,933
Building 910	15	0	15,432	19	0	19,289
Building 914	0	0	1,741	0	0	1,741
Building 916	1.5	0	596	2.3	0	912
Building 927	0	0	4,182	0	0	6,273
Micro and Nano Technologies Laboratory (MANTL)	0	0	7,109	0	0	8,673
Chemical and Radioactive Detection Laboratory (CRDL)	13	0	1,169	68	0	6,135
Area 8 Facilities	168	0	814	67	0	326
Explosives Storage Area (ESA)	0	0	0	0	0	0
Hazardous and Radioactive Waste Storage Facilities	0	0	0	0	0	0
Subtotals Existing Facilities	198	0	33,487	156.3	0	46,282
New Facilities						
LIGA Technologies Facility (LTF)	0	0	0	0	0	2,964
Distributed Information Systems Laboratory (DISL)	0	0	0	0	0	0
Glass Furnace and Melting Laboratory (part of the CRF)	0	0	0	0	0	50
Subtotals New Facilities	0	0	0	0	0	3,014
Total All Facilities	198	0	33,487	156.3	0	49,296

Sources: SNL/CA 2002b; TtNUS 2002a

^aIncludes RCRA Hazardous, California Toxic, TSCA, and biohazardous (MWMA)

LLW: low-level waste

LLMW: low-level mixed waste

RCRA: Resource Conservation and Recovery Act

TSCA: Toxic Substances Control Act

MWMA: Medical Waste Management Control Act

ued operations at specific facilities under this alternative, the radioactive waste generation impacts would continue to be minimal.

5.4.9.2 Hazardous Waste

Existing Operations

The Planned Utilization and Operations Alternative total hazardous waste generation would increase for existing facilities. Under the Planned Utilization and Operations Alternative, SNL/CA anticipates 98,833 kg per year of hazardous waste through 2012. There would be sufficient

capacity to accommodate anticipated operations total hazardous wastes. Projections for specific facilities for existing operations are presented in Table 5-24.

New Operations

SNL/CA anticipates annual generation of 3,014 kg of hazardous waste by new operations over the next 10 years. The majority of the additional waste would be due to the full implementation of LIGA wafer production operations (Table 5-24, 2,964 kg/yr). New SNL/CA operations would account for three percent of the total hazardous waste at the site (Table 5-25).

Table 5-25. Average Annual Hazardous Waste Generation under the Planned Utilization and Operations Alternative (in kilograms)

All Waste	Unit	5-Year Average (1996 through 2000) ^a	Planned Utilization and Operations Alternative
RCRA Hazardous Waste			
Existing Operations	kg	8,659	11,967
New Operations	kg	0	779
Balance of Operations	kg	13,178	12,809
SNL/CA Total RCRA Hazardous	kg	22,616	25,556
Percent Change		0%	+13.0%
California Toxic Waste			
Existing Operations	kg	9,922	13,713
New Operations	kg	0	893
Balance of Operations	kg	15,099	14,677
SNL/CA Total California Toxic	kg	25,914	29,283
Percent Change		0%	+13.0%
TSCA			
Existing Operations	kg	14,695	20,310
New Operations	kg	0	1,323
Balance of Operations	kg	22,365	21,739
SNL/CA Total TSCA	kg	38,383	43,372
Percent Change		0%	+13.0%
Biohazardous (includes MWMA waste)			
Existing Operations	kg	211	292
New Operations	kg	0	19
Balance of Operations	kg	321	312
SNL/CA Total Biohazardous	kg	551	623
Percent Change		0%	+13.0%
Total All Hazardous Waste			
Existing Operations	kg	33,487	46,282
New Operations	kg	0	3,014
Balance of Operations	kg	50,963	49,538
SNL/CA Total All Hazardous waste	kg	87,464	98,834
Percent Change		0%	+13.0%

Sources: SNL/CA 2002b; TtNUS 2002a

^a5-year average represents the No Action Alternative excluding new facilities

kg: kilograms

MWMA: Medical Waste Management Control Act

RCRA: Resource Conservation and Recovery Act

SNL/CA: Sandia National Laboratories, California

TSCA: Toxic Substances Control Act

Balance of Operations (Maintenance and Decontamination and Decommissioning)

During maintenance and D&D, SNL/CA would produce hazardous waste (includes construction debris) each year.

Projected hazardous waste quantities for these activities are included in Table 5-25 as balance of operations. This work would directly impact the quantity of TSCA waste requiring disposal. SNL/CA would generate TSCA waste,

primarily PCBs and asbestos that are removed from transformers and buildings. Assuming that up to 20,000 gsf would be removed, D&D activities would generate 133 tons of debris.

Current Capacity

The total hazardous waste generated per year requiring offsite disposal at licensed/approved facilities would not exceed the existing storage and handling capacities at the Hazardous Waste Storage Facility. Projections indicate that an increase of 13 percent of total hazardous waste generation would occur. SNL/CA routinely ships hazardous waste to various offsite commercial disposal facilities. All waste is shipped in less than one year to meet regulatory requirements. Based on these projections and continued operations at specific facilities under the Planned Utilization and Operations Alternative, the hazardous waste generation impacts would be minimal.

5.4.9.3 All Other Wastes

SNL/CA operations also involve four additional waste management activities discussed below.

Biohazardous (Medical Waste Management Act) Waste

Under the Planned Utilization and Operations Alternative, biohazardous waste generation would increase from 551 kg/yr to 623 kg/yr (see Table 5-25). The existing waste handling capabilities would be adequate to accommodate this waste. No additional offsite impacts would occur, because offsite disposal capacity would be sufficient.

Construction Waste

Under the Planned Utilization and Operations Alternative, construction debris would include the construction of facilities identified in the No Action Alternative (LTF, 60 tons; DISL, 140 tons; and Glass Furnace and Melting Lab, 8 tons) plus the new badge office (10 tons). Since a typical roll off container handles 20 tons of debris, the expected construction waste would be minimal. No additional offsite impacts would occur, because offsite disposal capacity would be sufficient.

Municipal Solid Waste

Under the Planned Utilization and Operations Alternative, an estimated 279.7 metric tons would be generated annually. No appreciable impacts to disposal facilities would occur because existing waste handling capabilities are already in place.

Wastewater

SNL/CA would generate approximately 13.6 to 21.5 M gal of wastewater annually compared to 15 million gallons in CY2000. Sufficient disposal capacity would be available (see Table 5-21).

5.4.10 NOISE

Under the Planned Utilization and Operations Alternative, activities at SNL/CA would increase beyond current land uses and planned facility operations for all facilities in support of SNL/CA's assigned missions. The increase would include ongoing and planned Arroyo Seco improvements, land use changes, and new facility construction and upgrades, where detailed design and associated NEPA documentation are not expected to be complete before the Final SWEA is approved.

Noise levels under the Planned Utilization and Operations Alternative are similar to those described under the No Action Alternative. During the site preparation phase of construction of new facilities, relatively high and continuous levels of noise in the range 93 to 108 dBA would be produced by heavy equipment operations. Upon completion of construction activities, noise levels would return to preconstruction levels (55 to 65 dBA).

5.4.11 HUMAN HEALTH AND WORKER SAFETY

The Planned Utilization and Operations Alternative would result in the human health and worker safety impacts described in the following sections for radiological health and occupational health and safety.

5.4.11.1 Radiological Health Effects

Under the Planned Utilization and Operations Alternative, NNSA expects minimal worker radiological health impacts from the SNL/CA activities. The values for this alternative were calculated assuming the number of radiation workers and their average annual radiation dose would be the same as for the past 3 years. In addition, NNSA assumed that the ratio of radiation workers to total employees and the average radiation dose to these workers would remain constant. Table 5-26 presents estimated radiation doses for the collective population of workers who would be directly involved in implementing the alternative as well as LCFs likely attributable to these doses.

The estimated number of LCFs listed in Table 5-26 for the Planned Utilization and Operations Alternative can be compared to the projected number of fatal cancers from all causes. Population statistics indicate that cancer caused 23 percent of the deaths in the U.S. in 1997 (CDC 1998). If this percentage of deaths from cancer continues, 23 percent of the U.S. population would contract a fatal cancer from all causes. Thus, in the population of 1,222 workers, 284 persons would be likely to contract fatal cancers from all causes. In all cases, the incremental impacts from SNL/CA operations would be small.

Table 5-26. Estimated Radiological Dose and Health Impacts to Sandia National Laboratories, California Workers by Alternative

Health Impact	No Action Alternative	Planned Utilization and Operations Alternative
Collective involved worker dose (person-rem)	0.85 ^a	1.0
Estimated increase in number of latent cancer fatalities	3.4×10^{-4}	4.0×10^{-4}

Sources: DOE 1999d, 2000d, 2001g, TtNUS 2002a

^aSNL/CA involved worker dose estimated at 11 percent of SNL lab-wide totals in Table 4-15. Any increase in estimated radiation doses would be a result of the increase in radiation workers and not the result of different exposure mechanisms or levels.

rem: Roentgen equivalent, man

5.4.11.2 Occupational Health and Safety

Table 5-27 estimates the number of TRCs and LWCs that could occur under the Planned Utilization and Operations Alternative. The projected injury rates are based on an average historic SNL/CA injury rates over a 3-year period from 1999 through 2001 (DOE 2002b). These rates were then multiplied by the anticipated workforce levels for this alternative to calculate the number of TRCs and LWCs.

The TRC value includes work-related death, illness, or injury that resulted in loss of consciousness, restriction from work or motion, transfer to another job, or required medical treatment beyond first aid. The data for LWCs represent the number of workdays beyond the day of injury or onset of illness that the employee was away from work or limited to restricted work activity because of an occupational injury or illness.

5.4.12 SOCIOECONOMICS

The Planned Utilization and Operations Alternative would result in no appreciable impacts to demographic characteristics, economy, and community services in the ROI, as discussed below.

5.4.12.1 Demographic Characteristics

The Planned Utilization and Operations Alternative would not be likely to have any noticeable change in existing demographic characteristics within the ROI (Section 4.14.3). Under this Alternative, employment is expected to increase by 179 workers. Assuming, for a conservative analysis, that all employees would migrate

in from areas outside of the ROI, the population increase not realized by the ROI would represent an extremely small percentage (far less than one percent) of the 2000 ROI population as a whole.

5.4.12.2 Economic Base

The Planned Utilization and Operations Alternative would not be likely to have a noticeable change in the existing economic base in the ROI (Section 4.14.3). Table 5-28 presents the direct and indirect impacts SNL/CA operations currently (FY 2000) have on the economy of the ROI. Table 5-29 presents the direct and indirect impacts SNL/CA's Planned Utilization and Operations Alternative operations would have on the 2000 economy. (In order to provide a more conservative estimate of the impact of this alternative, a comparison is being made between Planned Utilization and Operations Alternative expenditures and FY 2000 economic indicators.) As the data indicate, SNL/CA's 2000 payroll expenditures represent only 0.1 percent of the total personal income for the ROI. Additionally, SNL/CA's 2000 employment represents only 0.2 percent of the 1,455,700 individuals currently employed in the ROI.

SNL/CA estimates that the Planned Utilization and Operations Alternative will require 1,497 (including contract employees) employees and \$170.3 million in total operating expenditures. From 1998-2000, SNL/CA payroll expenditures represented an average of 51 percent of the total operating budgets. Therefore, SNL/CA estimates payroll expenditures under the Planned Utilization and Operations Alternative at \$86.9 million. This represents a \$13 million increase in payroll expenditures (over

Table 5-27. Estimated Occupational Safety Impacts to Sandia National Laboratories, California Workers

Worker Safety Parameters	No Action Alternative	Planned Utilization and Operations Alternative
Workforce	1,043 – 1,317	1,222 – 1496
Total recordable cases of accident or injury	43 – 54	50 – 61
Lost workday cases	10 – 13	12 – 15

Sources: SNL 2001i, 2002a

Table 5-28. Sandia National Laboratories, California's Current Impact on the Regional Economy

Economic Measure	FY 2000		
	SNL/CA	Total ROI	Percent of ROI
Earnings (Income) (\$Millions)			
Wages and Salaries	74.3		
Indirect and Induced	47.6		
TOTAL EARNINGS	121.9	\$108,376.8	0.1
Earnings Multiplier: 1.64 (2002)			
Employment (Number of Workers)			
SNL/CA Workforce	1,317		
Indirect and Induced	1,264		
TOTAL EMPLOYMENT	2,581	1,455,700	0.2
Employment Multiplier: 1.96 (2002)			

Sources: BEA 2000b, BEA 2002a

FY: fiscal year

ROI: region of influence

SNL/CA: Sandia National Laboratories, California

Table 5-29. Sandia National Laboratories, California's Estimate of Planned Utilization and Operations Alternative Impacts on the Regional Economy

Economic Measure	Planned Utilization and Operations Alternative		
	SNL/CA	Total ROI	Percent of ROI
Estimated Earnings (Income) (\$Millions)			
Wages and Salaries	86.9		
Indirect and Induced	55.6		
TOTAL EARNINGS	142.5	\$108,376.8	0.1
Earnings Multiplier: 1.64 (2002)			
Employment (Number of Workers)			
SNL/CA Workforce ^a	1,496		
Indirect and Induced	1,436		
TOTAL WORKFORCE	2,932	1,455,700	0.2
Employment Multiplier: 1.96 (2002)			

Source: BEA 2000b, BEA 2002a

^aEmployment would range from 1,222 to 1,496 workers.

ROI: region of influence

SNL/CA: Sandia National Laboratories, California

the No Action Alternative). The Planned Utilization and Operations Alternative expenditures combined with indirect and induced expenditures would total \$142.5 million and would continue to represent 0.1 percent of the personal income in the ROI for the year 2000. Additionally, a total workforce of 2,932 persons (direct, indirect, and induced) would represent 0.2 percent of the 2000 employment level in the ROI.

5.4.12.3 Housing and Community Services

The Planned Utilization and Operations Alternative would not create a noticeable change in existing housing

and community services within the ROI (Section 4.14.3). Assuming one housing unit per additional employee, 179 housing units would be required. This number represents 0.5 percent of the housing stock available in the ROI. Therefore, ROI capacity would far exceed demand. Additionally, contributory effects from other industrial and economic sectors within the ROI would greatly reduce or mask the SNL/CA proportional impact.

5.4.13 ENVIRONMENTAL JUSTICE

The impacts of this alternative on environmental justice resources would be substantially the same as those associ-

ated with the No Action Alternative. For a summary of potential environmental justice impacts under the No Action Alternative, see Table 5-15.

5.5 MAXIMUM OPERATIONS ALTERNATIVE

5.5.1 LAND USE AND VISUAL RESOURCES

Implementing the Maximum Operations Alternative would not affect existing land use patterns or visual resources at SNL/CA. Sections 5.5.1.1 and 5.5.1.2 discuss these resource areas in relation to the Maximum Operations Alternative.

5.5.1.1 Land Use

No changes would occur to land use patterns at SNL/CA under this alternative. The extent of DOE land available for use by SNL/CA, 410 acres, would remain the same. SNL/CA operations would remain consistent with industrial research park uses and would not change established land use patterns or requirements.

Under this alternative, Building 916 would be replaced with a new building twice as big, and a new R&D building would be constructed. Both would be constructed within the 93 acres designated for new construction, thus there would be no impact to overall site land use, as explained in Section 5.4.1. Completion of these facilities would be consistent with the existing environment. In addition, the functions of these buildings would be consistent with those surrounding them. Structures no longer determined to be economically useful potentially would be vacated and removed (up to 100,000 sq ft). These existing structures are located throughout the SNL/CA and their removal would not impact land use.

5.5.1.2 Visual Resources

The Maximum Operations Alternative would not adversely change the overall appearance of the existing landscape, obscure views, or otherwise detract from the scenic views of SNL/CA or from areas adjacent to the site. A new Building 916 and a new R&D building would be constructed within the 93-acre construction area, and would be expected to have no impacts to visual resources. All construction would be consistent with campus-style design and the guidelines presented in the *Master Plan* (Royston *et al.* 1993). Although construction in this area increases the size of the main campus, it would have little or no effect on the scenic qualities of the SNL/CA site. Removal of facilities and structures would tend to improve the visual characteristics of the site.

5.5.2 GEOLOGY AND SOILS

As with the No Action Alternative, no impacts to general geology and geologic resources are anticipated. Additionally,

there would be no increase in the likelihood of impacts from seismic activity.

For a discussion regarding the Arroyo Seco Improvement Plan and the placement of the soil on a 25-acre part of the 93-acre future construction areas, see Section 5.4.2.

Construction activities would result in the construction of two new buildings totaling 100,000 sq ft. D&D activities would potentially remove 100,000 sq ft of facilities determined to be no longer economically useful. While these activities would disturb soil, these areas are part of the existing industrial park and the land would be used again for future construction; no impacts would be expected. Additionally, upgrades to storm water runoff areas would be beneficial.

In general, activities at SNL/CA would increase by 53 percent (derived from the increase in workforce) above the No Action Alternative. There would be a proportional increase in the likelihood of a spill or release to the environment; however, industry accepted controls are in place to minimize the potential for soil contamination from any SNL/CA operations.

5.5.3 WATER RESOURCES AND HYDROLOGY

The impacts of this alternative on water resources and hydrology would be essentially the same as those associated with the Planned Utilization and Operations Alternative. Due to the increased staffing levels (53 percent increase in staff site-wide) under this alternative, increases in discharge to the sanitary sewer system would occur. The capacity of the current system is adequate to handle this increase (see Section 5.5.7).

5.5.4 BIOLOGICAL RESOURCES

Under the Maximum Operations Alternative, impacts to biological resources would be substantially the same as those associated with the Planned Utilization and Operations Alternative. The main difference between the alternatives would be the use of two work shifts to increase R&D (versus the one work shift used in the No Action and Planned Utilization and Operations Alternatives). Due to the proposed disturbance of critical habitat for the California red-legged frog on the east side of SNL/CA, DOE would coordinate with the USFWS under the provisions of Section 7 of the *Endangered Species Act*.

Under this alternative, two new structures are proposed, including a new building similar to the CRDL and a replacement for Building 916. These proposed structures would have a negligible effect on biological and ecological resources. They would be constructed on previously disturbed land in either the existing footprint or within 93 acres designated for future development (see Section 5.4.4.2).